Similar advantages are obtained with that form of the invention that uses a meltable and resettable polymer solely to adhere the reinforcing material to the rigid substrate.

The invention in its preferred forms provides a very simple cost and time effective means of both sealing and simultaneously reinforcing building materials so as to improve their water resistance and strength characteristics.

This can result on the one hand, in products of only slightly increased thickness having substantially improved strength characteristics, which increases their potential range of applications, in that the products are potentially less brittle, easier to handle and more durable in terms of improved weather resistance and impact resistance.

Alternatively, the invention can be used to provide products having at least equivalent or potentially better strength characteristics to existing products, but in a form that is lighter in weight and easier to transport and handle.

The invention has particular advantages when applied to the specific field of structural flooring for use in wet area flooring and external decking. In this regard, fibre cement materials are potentially suited to such applications in terms of their durability and resistance to rot but the brittle nature of fibre cement and its reduced load bearing capabilities when wet, does in many ways limit its applications. However, as can be seen from the example above, modification of these basic flooring substrates in accordance with the invention, dramatically improves the strength characteristics of these boards. This also facilitates extended use of fibre cement products in decking applications where there may be some current resistance due to the brittleness of the base product. By having an integral reinforcing material, the product will be less prone to brittle type failure, but where this does occur the reinforcing may act to retain the fragments of the substrate in a similar manner to laminated glass products.

As mentioned above the building element of the present invention is particularly suitable for structural flooring as it does not require a tile backerboard to adhere tires to the structural flooring. Similarly, the element is suitable for external decking due to the inventive synergistic combination of moisture resistance and increased structural integrity.

The invention also allows more conventional fibre cement products to be readily adapted for use in impact resistant walling applications such as is required in hospitals and schools.

Another advantage of the invention is that the applied reinforcing helps to resist edge break out when nailing the perimeter of a building sheet, or when the fastened sheet is exposed to shear or racking forcing when fastened to framing.

It should be mentioned, that while the invention was developed primarily for use with fibre cement substrate materials, it can clearly be seen that it will have useful application with a variety of other base materials including manufactured wood, plywood etc.

Similarly, while the invention has been described in relation to the preferred application to building sheets and building panels, the invention can be applied to non-planar building elements made from similar materials such as trim components and the like, the reinforcing elements serving to increase bending strength and thereby improve handle-ability etc.

Although the invention has been described with reference to specific examples it will be appreciated by those skilled in the art that the invention may be embodied in many other forms.

The invention claimed is:

1. A reinforced building element including:

a rigid cementitious substrate having a first face, wherein said cementitious substrate has a density range from 0.8 g/cc to 1.5 g/cc;

a layer of ultraviolet (UV) radiation curable resin, said UV radiation curable resin is formed on the first face of the rigid cementitious substrate, said UV radiation curable resin comprising about 10 to 50% by weight of lower molecular weight monomers and about 10 to 50% by weight higher molecular weight oligomers; and

a layer of reinforcing material having an upper surface, wherein said reinforcing material is adhered to said first face of said rigid substrate by the UV radiation curable resin which is disposed between the reinforcing material and the first face of the rigid substrate, wherein the reinforcing material is partially embedded in the layer of UV radiation curable resin in a manner such that the upper surface of the reinforcing material stands proud of the radiation curable resin, said reinforcing material having substantially the same or higher modulus of elasticity to that of the cementitious substrate such that UV radiation curing can pass sufficiently through or around the reinforcing material to cure the resin embedded therein sufficiently to adhere the reinforcing material to the cementitious substrate.

2. The reinforced building element of claim **1**, wherein the rigid substrate is constructed from fibre reinforced cement.

3. The reinforced building element of claim **1**, wherein the rigid substrate is a cellulose fibre reinforced cementitious article.

4. The reinforced building of claim **1**, wherein the radiation curable resin covers the entire first face of the rigid substrate.

5. The reinforced building element of claim **1**, wherein the radiation curable resin is provided over a portion of the first face to give sufficient adherent contact with the reinforcing material.

6. The reinforced building element of claim **1**, wherein the reinforced building element comprises a further coating to cover the reinforcing material.

7. The reinforced building element of claim **1**, wherein the reinforcing material is selected from the group consisting of continuous strand, ribbon, rod, mesh material, sheet material and combinations thereof.

8. The reinforced building element of claim **1**, wherein the reinforcing material comprises continuous organic or inorganic fibres.

9. The reinforced building element of claim **1**, wherein the reinforced building element includes an arrangement at least along its edges adapted to interlock with adjacent reinforced building elements and thereby form a panel or floor.

10. The reinforced building element of claim **1**, wherein a layer of reinforcing material is provided and adhered to both the first face and a second face of the rigid substrate.

11. The reinforced building element of claim **1**, wherein the radiation curable resin is a sealer.

12. The reinforced building element of claim **1**, wherein the reinforced building element comprises one or more layers of radiation curable material above and below said reinforcing material.

13. A method of manufacturing a reinforced building element including the steps of:

applying an ultraviolet (UV) radiation curable resin to a first face of a rigid cementitious substrate, said UV radiation curable resin having a high solids content and a thickness of between 1-1000 micrometers;